# TRMM Flight Operations Monthly Status Review (MSR)

May 30th, 2001

# FOT Subsystem Overview

- Operations Status
  - Flight Ops Summary - Lou Kurzmiller
  - ACS & FDS / C&DH - Mark Fioravanti
  - RCS & RF / Comm. - Dave Sepan
  - Electrical & Thermal - Dave Sepan
  - Power & Deployables - Justin Knavel
  - LIS - Justin Knavel
  - CERES & VIRS - Mark Fioravanti
  - TMI & PR - Dave Sepan
  - Ground System - Dan Palya
  - Upcoming Activities - Lou Kurzmiller

# Flight Operations Summary

- Supported 556 SN events in May
  - 1 Yaw Maneuver
  - 8 Delta-V Maneuvers
- 3 Anomaly Rpts; 5 Event Rpts & 2 Generic Late Acq Rpts generated
  - AR #87: GSACE A DCM +5V Converter - Closed
  - AR #88: ACS,GSACE, PWR tlm spikes - Closed
  - AR #89: PWR tlm dropouts, Possible Auto-SPRU
  - ER #232: SN; Operator Error at STGT
  - ER #233: MOC H/W; 2 hard drives replaced String 2
  - ER # 234: MOC S/W; String 1 unable to call current page directory
  - ER #235: SN; IONET Problem WSC-GSFC; No data lock entire event
  - ER #236: SN; WSC showed an event not on FOT confirmed event list

# Flight Operations Summary

- Notable Events
  - Extensive analysis of data downlink anomalies
  - Some CERES instrument activity
  - 1console analyst, 1 Subsys Eng left FOT
    - Hired one console analyst
    - Waiting to fill Subsys Eng slot

# Flight Ops Summary

| SPECIAL SPACECRAFT EVENTS AND ACTIVITIES FOR TRMM 2001 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTALS |
| 2 | 8 | 7 | 10 | 12 | 8 | | | | | | | | 45 |
| 2a | 1 | 1 | 1 | 2 | 1 | | | | | | | | 6 |
| 2b | 0 | 0 | 0 | 0 | 0 | | | | | | | | 0 |
| 2c | 0 | 0 | 0 | 0 | 0 | | | | | | | | 0 |
| 3 | 1 | 0 | 1 | 1 | 0 | | | | | | | | 3 |
| 3a | 1 | 4 | 2 | 9 | 3 | | | | | | | | 19 |
| 3b | 3 | 2 | 1 | 3 | 2 | | | | | | | | 11 |
| 3c | 1 | 1 | 1 | 5 | 1 | | | | | | | | 9 |
| 3d | 0 | 0 | 0 | 0 | 0 | | | | | | | | 0 |
| 3e | 1 | 0 | 0 | 0 | 1 | | | | | | | | 2 |
| 3f | 2 | 2 | 5 | 2 | 2 | | | | | | | | 13 |
| 4 | 3 | 1 | 0 | 0 | 1 | | | | | | | | 5 |
| 4a | 0 | 2 | 2 | 2 | 2 | | | | | | | | 8 |
| 4b | 1 | 1 | 2 | 1 | 2 | | | | | | | | 7 |
| 4c | 0 | 0 | 0 | 0 | 6 | | | | | | | | 6 |
| 4d | 5 | 0 | 3 | 8 | 4 | | | | | | | | 20 |
| 4e | 0 | 0 | 0 | 1 | 0 | | | | | | | | 1 |
| 5 | 3 | 0 | 2 | 4 | 1 | | | | | | | | 10 |
| 5a | 0 | 0 | 0 | 0 | 5 | | | | | | | | 5 |
| 5b | 0 | 5 | 0 | 0 | 0 | | | | | | | | 5 |
| 5c | 0 | 0 | 0 | 0 | 0 | | | | | | | | 0 |
| TOT: | 30 | 26 | 30 | 50 | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 175 |

**LEGEND**

| | STANDARD CATEGORIES | TRMM-SPECIFIC SUB-CATEGORIES AND EXAMPLES |
|---|---|---|
| 1 | Targets of Opportunity | N/A |
| 2 | S/C Maneuvers | DeltaVs **(2)**, 180° Yaw Maneuvers **(2a)**, 90° Yaws **(2b)**, Deep Space Cals **(2c)** |
| 3 | Unplanned Commanding | Blind Acqs **(3)**, Patch Loads **(3a)**, Manual DS Ops due to Blind Acqs, MI, etc. **(3b)**, EPVs Fail **(3c)**, VIRS Reset Ops **(3d)**, Anomaly Recoveries **(3e)**, Generic Late Acqs - GCMRs / DS Ops **(3f)** |
| 4 | Customer Requests | PR **(4)**, VIRS **(4a)**, LIS **(4b)**, CERES **(4c)**, FSW **(4d)**, AETD **(4e)** |
| 5 | Ops due to Celestial Phenomena | UTCF / FS Ops **(5)**, Power Ops - Autospru, TSMs, C/D **(5a)**, Xpdr Offset Ops **(5b)**, Leonids **(5c)** |
| 6 | Pre-Launch Testing | N/A |
| 7 | L&IOC Operations | N/A |
| 8 | EOL Operations | Delta-H Firings **(8)**, Reentry Maneuvers **(8a)** |

**NOTE:** This Record Documents S/C Activities and Does Not Include Other Special Activities Such as Ground System Testing, Simulations, Trending, or New Database, Script, Code, or Procedure Development...

# ACS Subsystem

- Solar Array Off-Pointing Test.
  - See Power Section for more details.
- ACS Ancillary Position Error Jumps (Anomaly #86)
  - Extensive Trending revealed that telemetry spikes were not seen on the spacecraft, and was a problem with one of PACOR-II's Front Ends.

# ACS Subsystem

- Open ACS CCRs (In order of Priority);
  - CCR #069: New table 85 to match new TDRS-8 continuity limits for other TDRS, and another table 85 to widen the limits after an update failure.
  - CCR #070: New version of Table 61 to incrementally pitch the S/C while in Sun Acq, if Solar Array fails.
  - CCR #005: Correction for Magnetic Field Epoch, if contingency mode is required for EOL activities.
  - CCR #065: Update ACS system tables in preparation for EOL activities.
    - » Table #73 (Thruster Parameters)
    - » Table #90 (Mode Configuration Data for Contingency)
  - CCR #053: ACS FS/W bug

# FDS/C&DH Subsystems

- UTCF Status;
  - No Adjustments were performed. The next one is expected on 01-152 (Fri. June 1st).
  - Current UTCF value is 31535996.824677 sec
  - A FS Adjustment was performed, on 01-121 (Tues., May 1st) and was adjusted by 12 counts to x'7C6'.
- Open CCRs;
  - CCR #047: Will work with FSW on no-clock software patch activities
  - CCR #048: New on-board DS filter table to record ACE 8-Hz data
  - CCR #077: Create a TSM to monitor the bus voltage in case of a PSIB telemetry failure.

# RCS Subsystem

- RCS performed 8 successful Delta-V maneuvers (#303 - #310)
  - Current fuel remaining is 413.251 kg
- EOL estimate is approximately **March, 2003**, using 157kg of fuel as a baseline.
- No Open RCS Anomaly or Event Reports
- Upcoming Events
  - Begin review of, and training in, Delta-H procedures, EOL scripts, and a “one-shot” procedure.
  - Review all required steps for a 30+ minute Delta-V maneuver and test with the simulator.

# RF Subsystem

- 2 Generic Late Acquisitions (#93-94)
  - 125/150000z TDS event: Locked up @ 150234z. One fwd reacq. was sent. Dump was performed. All data recovered.
  - 128/091100z TDW event: Locked up @ 091240z. One fwd reacq. was sent. Dump was performed. All data recovered.
- Frequency offsets (monthly average)
  - Transponder #1 = +724.173 Hz
  - Transponder #2 = -853.737 Hz
- No RF Event Reports or MOCRS this month
- Upcoming Events
  - Offset of transponder 2 frequency may occur in June.

# Thermal / Electrical Subsystems

- Thermal subsystem remains nominal; no open issues other than AETD will try to confirm whether one omni antenna is more vulnerable to atmospheric heating just prior to reentry.

# Power Subsystem

- ACS, GSACE, and Power Telemetry Spikes (Anomaly #88)
  - WBBAT2AHIN and WBBAT1AHOUT experienced 1 sample spikes on 3 different occasions in the LEVEL0 data. The spikes did not appear in the T1 data. This is the same PACOR-II Front End problem which caused the ACS and GSACE telemetry spikes.
- From 01-123 (May 3rd) to 01-135 (May 15th), Auto-SPRU was enabled to prevent overcharging at high Beta angles.
  - Power Telemetry Dropouts while Auto-SPRU enabled (Anomaly #89)
    - » While Auto-SPRU was enabled, different telemetry points, which had not been spiking since PSIB B was turned on, began to spike. When Auto-SPRU was disabled, the new telemetry spikes disappeared.
    - » When Auto-SPRU is disabled, Battery 1 Cell 22 voltage telemetry spikes low several times a day. When Auto-SPRU is enabled, Battery 2 Cell 22 voltage telemetry spikes low several time a day and Battery 1 Cell 22 stops spiking. This shifting is also seen before and after the PSIB Software Timer Patch is loaded .
- On 01-151 (May 31st), FSW is planning a Code Review for the S/C Processor Current filter. The filtered S/C Processor Current will be used to determine Essential Bus Voltage.

# Power Subsystem

- Off-pointing the Solar Array by 55 degrees
  - A 2 orbit Solar Array off-pointing test will be conducted on 01-150 (May 30th).

# Deployables Subsystem

- GSACE A DCM +5V Converter Anomaly (Anomaly #87)
  - On 01-101 (April 11th), the current and voltage began experiencing 1 sample spikes a few times each day. The current spiked to 2.18A and the voltage spiked to 0.49V. A constant 0.49V value of voltage indicates a failure of the +5V converter.
  - Further investigation showed select telemetry was shifted in the packet, indicating a telemetry problem and not a converter problem.
  - This anomaly report was closed and a new Telemetry Spike anomaly report (Anomaly #89) was opened.
- ACS, GSACE, and Power Telemetry Spikes (Anomaly #88)
  - Starting on 01-101 (April 11th), in addition to the GSACE current and voltage telemetry, several other GSACE telemetry points spiked but less frequently than the current and voltage.
  - Comparing the Level0 data (captured by PACOR-II) and the T1 data (captured by MOC), the spikes appeared in the Level0 data but not in the T1 data. Also, the spikes did not appear in the PACOR-A data.
  - After PACOR-II switched to a different Front End, the telemetry spikes disappeared.
- Solar array drives and HGA continue to operate nominally.

# LIS Instrument

- Two Routine MSFC real-time command requests were performed on 01-123 (May 3rd) and 01-145 (May 25th) to reduce packet sequence errors
- No open issues

# CERES/VIRS Instruments

- **CERES**, no change in status.
  - No Science collection due to, Data Acquisition Processor (DAP) Telemetry Drop Out and Possible Failure (Anomaly #81, 00-061 Jun 14th, 2000)
  - LaRC has plans on performed a series on Gimbal tests on the weeks of May 21st and May 28th.
  - CERES powered OFF on May 29th in preparation for Solar Array off pointing tests.
- **VIRS**, continues to operate nominally.
  - Two sets of VIRS Solar Calibrations were performed on 01-143 (Wed., May 23rd).

# TMI / PR Instruments

- No Open Issues with the TMI instrument

- PR LNA Analysis command request was performed on 01-141 (May 21st)
- No PR External Calibrations were performed in May
- No new PR interference was reported by NASDA in May
- Analysis continues as to the feasibility of operating the PR instrument at an altitude of 400 km in order to extend mission life - FDF is providing predicted orbit elements to NASDA

# Ground System

- The new System Software Release 9.1 patch is complete and will be installed within the next several weeks. It will be delivered to SOTA-7 and String-2 first, then String-3. After final evaluation, it will be made operational on String-1.
- The backup test and command string in Building 14 SOTA-7 is operational for emergencies and training. Full Mission Planning scheduling and load-building and trending capabilities still need to be implemented and verified.
- PC for PACOR-A operations completed final Security acceptance and has been installed on the closed network.
- Two 100 MHz workstations will be installed in the MOC next week.

# Upcoming Activities

- 0-2 Months
  - Award one Spacecraft Analyst Certificate
  - Complete the full Backup Control Center implementation including scheduling and mission planning
  - Complete Rel 9.1 installation to all strings and SOTA bay
  - Parallel operations with the new PACOR-A system and new web-based user interface training (ORR in June)
  - Test and install new Transponder-2 AOS Offset Relative Time Sequences
  - Install recently acquired GRO equipment - two 100 MHz workstations
  - Continue to close open CCRs, MOCRs, and MSR Action Items
  - Complete testing and training with contingency  SA 55° Offset configuration

# Upcoming Activities

- 2-3 Months
  - Award two Console Analyst certifications to new employees
  - Complete testing and training with PSIB alternate telemetry patch
  - End Of Life Planning, Testing, and Simulations continue